

**ICT EMPOWERED TEACHER EDUCATORS: STRATEGY FOR CONSTRUCTIVIST
LEARNING**

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Abstract

Information and communication Technologies (ICTs) are a major factor in shaping the new global economy and producing rapid changes in society. In the present day there is a conscious shift towards approaches that lead to constructivist learning recognizing the use of information technologies. The role of teacher educator/teacher has changed and continues to change from being an instructor to a facilitator and creator of a learning situation. This leads to a challenging task among the teacher educators as they need training not only in computer literacy but also in the pedagogical application of those skills to improve teaching and learning for successful integration of ICTs into teacher education. The paper looks into the challenges and issues faced by teacher educators in the fullest utilization of information and communication technology. It focuses on the professional development of teacher educators in various contexts of infusing technology into the educational system. The paper closes with a suggestion for a planned strategy which gives priority to capacity building of teacher educators ensuring the appropriate, effective and sustainable integration of ICTs that empowers them not just to prepare well trained teachers to implement but also to lead educational innovations that will transform schools and ultimately, all of society.

Key Words: *Information and Communication Technologies (ICTs), Constructivist Learning, Teacher Educator.*



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Introduction

Educational systems around the world are under increasing pressure to use the new information and communication technologies (ICTs) to teach students the knowledge and skills they need in the post-globalisation. With the emerging new technologies, the teaching profession is evolving from an emphasis on teacher-centered, instructivist approach to student centered, constructivist approach of interactive learning environments. Designing and implementing successful ICT-

enabled teacher education programmes is the key to fundamental, wide-ranging educational reforms. In the present scenario Teacher Education in India is being renovated and redesigned to make it constructive. New opportunities and possibilities especially those in electronic and other related applications for skill development arrangements stimulate the initiative for constructivist teacher education and the reform of the existing educational provisions.

In the past, the focus was on teachers for ICT-integration in education which though desirable could not effectively meet set objectives. The professional development of teacher-educators is essential. Unless teacher educators model effective use of technology in their own classes, it will not be possible to prepare a new generation of teachers who effectively use the new tools for learning. The paper discusses extensively issues pertaining to building capacity and confidence of teacher educators in use of ICT, meeting the continuing professional development needs of teacher educators and addressing the needs and expectations of teacher educators in techno-mediated learning environment.

Constructivism Paradigm and Need for ICT Empowerment of Teacher-educators

At its simplest constructivism hypothesizes that knowledge is constructed; in other words, individuals make sense of their world by constructing their own representations or models of their experiences (Jonassen, Peck & Wilson, 1999). Constructivism is founded on the work of individuals such as Piaget, Dewey, Vygotsky, Ernst von Glaserfeld, Kant and Kuhn (Phillips, 1995; Twomey Fosnot, 1996). There are a number of constructivist positions which differ particularly in terms of the relative emphasis placed on the role of the individual versus the 'social' (Bickhard, 1998; Phillips, 1995). Particular 'schools' of constructivism include cognitive constructivism, radical constructivism, situated constructivism and co-constructivism. Kanuka and Anderson (1999) note that each of the 'schools' of constructivism have four central beliefs in common:

- that new knowledge is built on the foundations of previous learning;
- that learning is an active rather than passive process;
- that language is an important aspect of the learning process; and
- that learning environments should be learner-centred.

Constructivism, as a theory of learning, has major ramifications for the goals teachers set, the strategies they adopt and the methods of assessment they use (Twomey Fosnot, 1996). Constructivist approaches emphasise teaching, not about imparting knowledge but about facilitating learning; assisting learners in their own construction of knowledge. Constructivism is gaining considerable influence in the integration of information technology into educational contexts at primary, secondary and tertiary levels. Jonassen, Peck and Wilson (1999), for instance, demonstrate how technology can be utilised to support constructivist learning. They argue that meaningful learning will result when technologies engage learners in:

- Knowledge construction, not reproduction;
- Conversation, not reception;
- Articulation, not repetition;
- Collaboration, not competition; and
- Reflection, not prescription.

ICT-enhanced constructivist classroom practices, however, require that teachers play a new role. The role of the teacher will change from knowledge transmitter to that of learning facilitator, knowledge guide, knowledge navigator and co-learner with the student. The new role does not diminish the importance of the teacher but requires new knowledge and skills. Students will have greater responsibility for their own learning in this environment as they seek out, find, synthesize, and share their knowledge with others. ICTs provide powerful tools to support the shift to student-centred learning and the new roles of teachers and students. This means that opportunities, like exposure to a number of critical examples and experience in designing ICT-based activities and integrating them in their classroom practice in constructivist ways are of great priority. The aim is to convince teachers for the potentiality of ICT as constructivist learning tool and to give a clear understanding of the educational functionality of technological tools in their educational practices through their professional training. In this context the role of teacher educators is to mend the existing system with vision to produce quality teachers for schools. As the power and accessibility of ICT has expanded, teacher educators have focused on two broad areas. The first relates to what may be called “learning-to-use” technology. Educators are taught the necessary skills to use ICT across a variety of personal and professional levels.

The second area, “using-to-learn”, focuses on how ICT can be integrated into the total teaching and learning process and how by using ICT effectively basic knowledge and skills can be learned. The four themes identified by UNESCO Planning Guide (2002) i.e. *Context and Culture, Leadership and Vision, Lifelong Learning, Planning and Management of Change* act as a strategic combination of approaches that help teacher educators develop the four core competencies including pedagogy, collaboration and net working, social issues and technological issues. The core competencies are clusters of objectives for successful use of ICTs as tools for learning and empower the teacher educators for effective implementation of constructivism paradigm.

Changing Role of Teacher Educators

Under the changing scenario of globalisation and development of information and communication technologies, there is a need to redefine the role of a teacher-educator. It is high time that they understand their role rather than simply assess the teacher education system. If they do not contribute, they will move from the current marginalized status to the one of irrelevance. They will have to respond at both conceptual/empirical and pedagogical levels (Liston et.al. 2008). For the successful integration of ICT in teacher education, in addition to taking up the role responsibilities in the areas of competence, commitment and performance, the teacher-educator must shoulder the additional, rather survival responsibilities outlined below :-

- Act as a role model for pre-service trainees and in-service teachers, demonstrating the use of technology across the curriculum.
- Encourage technology integration among the trainees, colleagues, teachers and parents.
- Be involved in planning and implementing ICT professional development training.
- Be up-to-date with the latest technological developments and advise the institutions concerning technology advancements and up gradation.
- Interact through e-mail/forum/communities/blogging with trainees, participating schools, and parents.
- Aid in the implementation of technology plans of the institutions.
- Plan, design, and demonstrate the use of multimedia applications for instructional use through multimedia projects.

- Examine a variety of evaluation and assessment tools including electronic portfolio assessment.
- Become active, competent online users of telecommunication services and act as model in the use of internet as an instructional tool.
- Address issues related to acceptable user policies, student safety, ethics, security, copyright, etc.
- Be involved in marketing the best practices of technology integration.
- Manage the available resources more productively to face the ever increasing financial crunch.
- Use information literacy to access, evaluate, and use information from a variety of sources.
- Have the competencies in software evaluations and advise the institutions in making the right choices.

ICT Training Inputs for Teachers and Teacher- Educators

Teacher educators, because they have to work in multiple contexts-both the home institution and the field where students are placed to observe and practice teaching-may also be more influenced by the absence of the essential conditions for ICTs in teacher education. Four stages are common, but they may be repeated with new forms of ICTs or applications of ICTs to new areas. The first stage for each individual is awareness, and the appropriate response at this stage is to provide information about a relevant application of ICTs and appropriate ways that it may be used in the individual's current professional or personal concerns. Please note the learner-centred nature of this approach; the concerns are not those of the supporter (the ICT expert) or the organization, but of the individual teacher educator. Teacher educators then explore the use of the application. They need support to put this ICT application into practice in a timely manner and to reflect on its effectiveness. Only after teacher educators have gone through these stages are they able to adapt their practice to make better use of ICTs, and then move toward the final stage to become innovators and modelers of excellent practice for their students and colleagues (UNESCO, 2002). For the successful implementation of ICT, teacher trainees, teachers and teacher- educators need to be trained in the following dimensions.

1. Awareness phase: The input should be to make the teachers aware of the importance and possibilities of ICT-the current trends and future projections.
2. Learning theories and technology integration: Traditional and modern view of learning, shift from teaching to learning, constructivism, role of ICTs in lifelong learning.
3. Basic hardware skills : Hands on experiences in operating a) the PC and laptops-switching on, shutting down, and networking, b) storage devices- using floppy drive, CD ROM drive, flash drive, and burning CD-ROM , c) output devices-using printers and speakers, d) input devices-using keyboard (Including shortcuts), mouse, modem, scanners, web cam, digital camera, camcorders, data loggers and d) display devices- data projectors, and interactive white boards.
4. Understanding system software: Features of desktop, starting an application, resizing windows, organizing files (Creating, editing, saving and renaming), switching between programs, copying etc.
5. Using application/productivity software: Word processing, spreadsheet, database, presentation, publishing, creation of Portable Document Format (PDF) files, test generation, data logging, image processing etc.
6. Using multimedia: Exposure to multimedia CD ROMs in different subject, installing programs, evaluating CD ROMs, approaches to using CD ROMs, creating multimedia presentations.
7. Using internet: e-mail, communities, forums, blogging , wiki: subscription to mailing lists, e-mail and internet projects, web searching strategies (navigating, searching, selecting, and saving information) videoconferencing, designing web pages, freeware and shareware, evaluating website resources, virtual fieldtrips, learning opportunities using the web, and netiquette.
8. Pedagogical application of ICT tools: Specific use of application software in different subject, appropriate ICT tools and pedagogy, unit plan integrating ICT tools, approaches to managing ICT-based learning groups, assessment of learning, electronic portfolio and assessment rubrics, creating teacher and student support materials, supporting students with special needs.
9. Introduction to open source software: Concept, types, advantages, working on open sources application software.

10. Social, legal, ethical and health issues: Advantages and limitations of computer use, privacy violations, copyright infringement, plagiarism, computer security (hacking, virus, misuse, abuse and staying safe) healthy use (seating, light, sound, radiation, exercise)

11. ICT for professional and personal productivity: ICT for administration, record keeping, reporting and transfer of information, attendance, research, careers in computers and professional development opportunities.

As an advanced training website development, installation and use of server based applications, training in course management system, e-learning course content development using various authoring tools, audio/video /image editing, animation etc. can be introduced. In addition to the hands on experiences every training program could include an ICT awareness /familiarity quiz, exhibitions of ICT books and multimedia CD ROMs by commercial agencies, poster session on success stories, case study presentations and analysis, ICT based demonstration lesson in the schools (whole class, small group, internet based, etc) exhibitions and presentations by commercial agencies on emerging technologies.

Challenges for ICT Empowerment of Teacher-Educators: To be able to integrate ICT in teacher training institutions, the teacher trainers need to feel confident in using ICT themselves. This is not always the case (; Judge & O'Bannon, 2008; Whittier & Lara, 2006).The research review report by OECD Directorate of Education which covered research in 11 OECD-countries during the years 2002–2009 identified a number of reasons that explains the lack of teacher-educators' use of ICT in teaching. In USA, teacher trainers report lack of time as a reason for not being updated in the field of technology. Lack of access to equipment and the need for training and support were also reported as problems. In the Netherlands Drent and Meelissen (2008) studied what factors obstructed or stimulated teacher trainers to use ICT innovatively. Teacher trainers who use ICT innovatively in their learning process are interested in their own professional development, keep extensive contacts with colleagues and experts in the area of ICT see and experience the advantages of the innovative use of ICT in education and the pedagogical approach can be described as student-oriented. Similar conclusions are drawn from Switzerland. The only difference is that lack of technological equipment and software is not a barrier to the integration of ICT in their teaching. It is the lack of competences in implementing these tools which constitutes a real difficulty. Whether teacher trainers have competences in computer

science or not, does not make a difference in their pedagogical representations regarding the use of ICT, but it has an impact on the probability that they will integrate ICT in their practices. Earlier studies and overviews have shown that teacher educators and also mentor teachers do not have enough confidence in using technology, and the equipment is not always what could be expected (e.g. Moursund & Bielenfeldt, 1999). Australian Country report on ICT in initial teacher training summarizes the barriers in the use of ICT by teacher educators in the following lines. Most teacher trainers are not yet role models for teaching with ICT. Traditional forms of teaching are still dominant, coupled with considerable skepticism of many regarding the potential of ICT to improve teaching and learning outcomes. Interested teacher trainers perceive a lack of own pedagogical training for using ICT in teaching. Because of time constraints many teacher trainers find it difficult to acquire necessary skills and to explore the use of ICT in classroom settings. Assessment of teacher competences does not involve the use of ICT in teaching and, hence, personal incentives for a more intensive usage are missing.

In the same way India faces a number of unresolved issues and challenges for the integration of ICT particularly in the education sector which are also relevant to teacher education. The issues are like technophobia among the teachers and teacher educators, lack of academic auditing and monitoring of ICT enabled teacher education initiatives, lack of adequate funding, absence of concrete data base, lack of clear guidelines for developing quality content, lack of co-ordination among the organisations which take decisions regarding curriculum, infrastructure, content, policy making, and policy implementation. Other constraints faced by India include linguistic diversity and income disparity. The digital divide in the country is so acute that it becomes difficult for the policy-makers to frame universal policies for the ICT integration in teacher education to be implemented.

Initiatives to be taken by Teacher Educators: Without the leadership, commitment and initiatives of the teacher educators, the transformation can't be achieved whatever may be the inputs in the training and however well designed it is. In this direction, the Government of India (GOI) has initiated several programmes starting with the Computer Assisted Learning and Teaching (CALT). Under this teacher educators were provided initial training in the use of computers. Other schemes include financial support to acquire hardware, setting up of computer labs and other resource supports. The initiatives of NCTE to impart sustained professional

development to all teacher educators from all the recognized institutions of teacher education across the country and to make Information Communication Technology (ICT) a part of the teacher education curriculum through the XPDITTE (X-elerated Professional Development in the Integration of Technology in Teacher Education) project is worth noting. All these developments posed new questions on the way teacher educators view learner and learning, available technology and ICTs and provisions of teaching and learning. The teacher educators could adopt initiatives like:

1. Self-learning using the tutorials available on the net or print medium.
2. Hiring an ICT expert by a group of teachers/teacher educators.
3. Enrolling for online professionally development courses.
4. Enrolling for the best commercially available ICT training programs.
5. Coaching by a colleague-Mentoring.
6. Attending ICT training courses, seminars, conferences and workshops.
7. Communities of teachers' collaborative groups to integrate ICT into their curriculum (same subjects, different subjects, same school/college, different school/college)
8. Online learning by means of videoconferencing, discussion forum, chat, blogging etc.
9. Visiting institutions where the ICT is already being integrated.
- 10 Action research trying out various models of technology integration and publishing the result of the same.
11. Membership and active participation in national and international associations, whose primary concern is technology. The organizations like international society for technology in education (ISTE), All India Society for Electronics and Computer Technology (AISECT), Society for Educational Technology, Research and Development (SETRAD) etc. could be considered.
12. Take up diploma or Certificate courses on ICT offered through distance mode by national or international universities and organizations.
13. Exploring the possibility of faculty exchange program to get placed in an organization where the ICT integration is already in place.
14. Taking up short-term or long-term projects related to ICT from ERIC, UGC, and ICSSR. This may be in collaboration with the schoolteachers.

15. Keeping up-to-date with the latest developments in ICT through journals, magazines, newspapers and the internet.

16. Teacher educators modeling the ICT integration in their academic work.

17. Planning and implementing ICT in-service training programs for schoolteachers- the best way to learn is to teach.

11. Creating a pool of ICT competent past teacher trainees and involving them in the training programs.

12. Designing and implementing self financing certificate course in ICT for in-service teachers.

UNESCO planning guide for ICT in teacher-education (2002) cites four professional development strategies which are helpful in successful technology integration.

1. First, professional development needs to focus on teaching and learning rather than on hardware and software. It should be designed by first considering what student teachers are expected to know and be able to do in a specific discipline, and then infusing ICTs into the learning process so that acquiring the knowledge and skills is more efficient.

2. Professional development is practically useless unless leaders and teacher educators are provided with access to technology resources and have the time and support-when needed – to apply the new knowledge and skills that they have learned. In this approach, professional development is provided to teacher educators when they have a need or opportunity to use a specific technology tool or application to enhance learning.

3. Professional development in the use of ICTs is not a one-time activity. To keep current with new developments means that professional development in ICTs must be an ongoing process.

4. A further strategy for professional development in the use of ICTs is to start in a small group of teaching staff. Working with this small group allows the professional development staff to determine the specific interests and needs of the teacher educators and what works best in the professional development process.

The application of these four strategies will be a mile stone towards effectively integrating ICT in Teacher-Education. All the teacher educators should be lifelong learners and should not shy away from learning new technologies and applying them in the field situations.

Conclusion: Teacher educators are experts in a realm of teacher preparation, and it is important to respect this domain while helping them to revitalize and modernize their teaching with ICTs.

An important aspect of their empowerment is not only enabling teacher educators to understand and use ICT tools in their teaching practices, but understanding how technology coupled with new approaches to teaching and learning, may enhance student centered learning. There is need for ICT empowerment of teacher educators to model excellent practice in their teaching so that their students can easily transfer these strategies into their own teaching practice. The major challenges in the way of ICT empowerment of teacher educators must be addressed if we are to succeed in integrating ICT seamlessly into teaching and learning, and transform the educational system into a constructivist, learning-centered environment for all students. Changes begin with small steps need to continue in spite of the difficulties and challenges that arise. The goal to provide the best education possible for our children is worth our concerted effort. Let us all come together and get ready to take up this challenge.

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